COLLEGE OF LIBERAL ARTS AND SCIENCES (CLAS) ACADEMIC ADVISING CENTER 2016-2017

# CELL AND MOLECULAR BIOLOGY-BS

THIS IS A **GENERAL** CURRICULUM GUIDE AND IS NOT APPLICABLE TO EVERY STUDENT. IT IS IMPORTANT TO MEET WITH YOUR ADVISOR.

| | | | |
|---|---|---|---|
| **Year One** | | | |
| [7]**BIO 120** General Biology | 4 | [7]**CHM 116** Principles of Chemistry II | 5 |
| Prerequisites: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently) | *(6)* | Prerequisites: CHM 115 and (MTH 122 or MTH 125 or MTH 201) | *(7)* |
| [7]**CHM 115** Principles of Chemistry or **CHM 180** or **CHM 109** | 2-4 | [6]**MTH 123** Trigonometry | 3 |
| CHM 115 Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201) | *(6)* | Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently) | |
| [6]**MTH 122** College Algebra | 3 | **WRT 150** Strategies in Writing | 4 |
| Prerequisite: MTH 110 or assignment through Grand Valley math placement | | Gen Ed | 3 |
| Gen Ed | 3 | | |
| Elective or Gen Ed | 1-3 | | |
| *Numbers noted within (parentheses) are contact hours* *Total* | *15* | *Total* | *15* |
| **Year Two** | | | |
| [2]**CHM 241** Organic Chemistry for Life Sciences I | 5 | **BIO 375** Genetics | 3 |
| Prerequisite: CHM 116 | *(7)* | Prerequisites: BIO 120; concurrent enrollment in BIO 376 | |
| **CMB 250** Introduction to Biotechnology | 3 | **BIO 376** Genetics Laboratory | 1 |
| Prerequisites: BIO 120 and CHM 116 | | Prerequisite: Concurrent enrollment in BIO 375 or successful completion of BIO 355 | *(3)* |
| [1]MATH/Physics Sequence (option A or B) | 4-5 | | |
| **STA 215** Introductory Applied Statistics | 3 | [2]**CHM 242** Organic Chemistry for Life Sciences II | 4 |
| Prerequisite: MTH 110 or equivalent | | Prerequisite: CHM 241 | *(6)* |
| | | [1]Physics Sequence | 4-5 |
| | | Gen Ed | 3 |
| *Total* | *15-16* | *Total* | *15-16* |
| **Year Three** | | | |
| **CMB 405** Cell and Molecular Biology | 4 | **CHM 462** Techniques in Biochemistry | 3 |
| Prerequisites: (BIO 375 or BIO 355) and BIO 376, and (CHM 232 or 242 or 247—may be taken concurrently) | | Prerequisite: CHM 461 or permission of instructor | *(7)* |
| [5]**CMB 406** Cell and Molecular Biology Laboratory *SWS* | 2 | **CMB 490** Internship | 2 |
| Prerequisites: CMB 405 (may be taken concurrently) | *(4)* | Prerequisite: Permission of instructor and program director | |
| **CHM 461** Biochemistry I | 4 | ***OR* CMB 499** Research in Cell and Molecular Biology | 2 |
| Prerequisite: CHM 242, CHM 247, or CHM 248 | | Prerequisite: Permission of instructor and program director | |
| [1]Physics Sequence | 5 | [4]Microbiology course (option A or B) | 4 |
| | | [1,3]Physics Sequence or Elective | 3-5 |
| | | Issue | 3 |
| *Total* | *15* | *Total* | *15-17* |
| **Year Four** | | | |
| **CMB 426** Nucleic Acids Laboratory | 3 | **CMB 495** Perspectives in Cell & Molecular Biology (capstone) | 3 |
| Prerequisite: CMB 406 | *(6)* | Prerequisite: CMB 499, BIO 499, BMS 499, or CHM 499 | |
| **CMB 490** Internship | 1 | Gen Ed | 3 |
| Prerequisite: Permission of instructor and program director | | Gen Ed | 3 |
| ***OR* CMB 499** Research in Cell and Molecular Biology | 1 | [3]Elective | 3 |
| Prerequisite: Permission of instructor and program director | | [3]Elective | 3 |
| Issue | 3 | | |
| Gen Ed | 3 | | |
| Gen Ed | 3 | | |
| [3]Elective | 3 | | |
| *Total* | *16* | *Total* | *15* |

[1] Students must select a math/physics option A or B. MTH 122 and 123 must be completed or waived prior to beginning either option.
**Option A**: MTH 125 Survey of Calculus, PHY 220 General Physics I, and PHY 221 General Physics II
**Option B**: MTH 201 Calculus I, MTH 202 Calculus II, PHY 230 Principles of Physics I, and PHY 231 Principles of Physics II

[2] Students may choose CHM 245, 246, 247, and 248 in place of CHM 241 and 242

[3] Elective refers to any course that will help you earn the required 120 credits to graduate; see list on reverse for suggested elective courses

[4] Select a microbiology course option A or B. **Option A**: BIO 357 Environmental Microbiology; **Option B**: BMS 212/213 Introductory Microbiology with lab

[5] Students must complete a total of two courses with an SWS attribute

[6] Math proficiency exams are available for MTH 122 and MTH 123. ***To take the Math Proficiency Tests online, visit this link: gvsu.edu/s/jk***

[7]CMB majors who have AP/IB Credit in BIO 120, CHM 115 and/or CHM 116 are generally better prepared for higher level courses if they take BIO 120, CHM 115 and CHM 116 at GVSU. **CHM 180** is recommended prior to CHM 115 if the ACT science subscore is below 23. Students who have not had any high school chemistry should take CHM 109 (not 180) prior to CHM 115. However, neither CHM 180 nor CHM 109 count toward the CMB major. CHM 180 has a corequisite of MTH 110.

*The block tuition rate is for 12-15 credits. You will pay additional tuition for any credits over 15

**Declaring the Cell and Molecular Biology Major:**

1. In myBanner, select "Student" > "Student Records" > "Change Major" > "Change Major 1/Program"
2. Choose "Cell and Molecular Biology-BS" from the drop-down box.
3. Click "Submit" and then "Change to New Program"
4. Declare **"PreProfessional Preparation"** as your SECOND MAJOR if you are planning on chiropractic, medical, dental, podiatry, pharmacy, or optometry school.

## General Education Overlap

| **General Education Categories fulfilled by the Cell and Molecular Biology Major:** | |
|---|---|
| Life Sciences with Lab: BIO 120 | Physical Sciences with Lab: CHM 115 |
| Mathematical Sciences: STA 215, MTH 122, MTH 123 | |
| **Additional Overlap for Pre-Professional Students** | |
| Social and Behavioral Sciences: PSY 101 | Social and Behavioral Sciences: SOC 101 |

## Pre-Professional Students

(Pre-Chiropractic, Pre-Dental, Pre-Medical, Pre-Optometry, Pre-Pharmacy, Pre-Podiatry, & Pre-Veterinary)

***Keep in mind that you may major in anything so long as you complete the prerequisites for your professional program.***

| **Cell and Molecular Biology Suggested Elective Courses** | | |
|---|---|---|
| BIO 403 Plant Structure and Function | BMS 310 Basic Pathophysiology | BMS 431 Medical Virology |
| BIO 416 Advanced Genetics Laboratory | BMS 311 Pharmacological Aspects of Biomedical Sciences | CMB 411 Genetics of Development and Cancer |
| BIO 422 Embryology | BMS 312 Bacterial Genetics | CMB 351 Bioinformatics: Tools and Techniques for Life Sciences |
| BIO 423 Plant Biotechnology | BMS 313 Bacterial Genetics Laboratory | CMB 440 Drosophila Genomics Research |
| BIO 432 Comparative Animal Physiology | BMS 422 Bacterial Physiology | CMB 452 Computational Biology |
| BMS 208 Human Anatomy | BMS 423 Bacterial Physiology Laboratory | CHM 351 Introduction to Physical Chemistry |
| BMS 290 Human Physiology | BMS 410 Immunology | CHM 463 Biochemistry II |
| BMS 291 Laboratory in Human Physiology | BMS 411 Immunology Laboratory | PHY 320 Optics |

**It is imperative to meet with your faculty advisor and an advisor in the CLAS Academic Advising Center regularly.**

## The CLAS Academic Advising Center is located in C-1-140 MAK, 616-331-8585

**http://www.gvsu.edu/clasadvising (Also find us on Orgsync, Facebook, and Twitter!)**

## Pre-Professional Advisors:


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**See http://gvsu.edu/s/zY for additional details regarding professional school information.**
**Follow the Pre-Professional Blog: https://preprofessionallakers.wordpress.com**